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INSTITUTE OF FISHERY TECHNOLOGY RESEARCH

Energy Consumption in the Norwegian Fishing Fleet, 1971-1980

Report dated 29 April 1982, by

Hans Erstad, Economics Department

Project Number: 662.5-1

ABSTRACT

The report presents an empirical analysis of various measures of energy consumption in the fishing fleet. It shows how the energy consumption varies with different operation types, vessel size, and operating time. An estimate of the total fuel consumption of the Norwegian fishing fleet is also presented.

The energy consumption dropped in 1980, and the relationship between this and the large fuel price increase is discussed. The potential for energy savings is also addressed.

The report analysis is based on accounting data from the Fisheries Budget Committee.

KEYWORDS:

Energy, types of operation, vessels.

Information Services

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SUMMARY

The report is based on accounting data from the Fisheries Budget Committee for the years 1971-1980. The report intends to show the changes in fuel consumption during this period for various types of operation. The cost per litre of Marine Diesel fuel has increased from 32.0 ore in 1971 to 147.4 ore in 1980 (360.6%), while the average price per kilo for the cod trawlers has increased from 1.7C crowns in 1971 to 4.35 in 1980 (155.9%).

The report analysis shows that fuel consumption in kg per kg of catch (energy coefficient) was relatively stable for the various types of operation, until 1979. However, in 1980 there was a reduction in the coefficient for most types of operation.

	Energy coefficient (kg per kg)	
	Range of variation in averages for the 1971-1979 period	Average in 1980
Coastal fishing	0.15 - 0.24	0.19
Bank fishing	0.31 - 0.42	0.30
Pollack seining	0.13 - 0.18	0.20
Fresh fish trawling	0.55 - 0.77	0.50
Salt fish trawling	0.69 - 0.87	0.53
Factory trawling	0.68 - 1.06	0.52
Industry trawling	0.07 - 0.09	0.057
Ring net	0.06 - 0.09	0.055
Coastal shrimp trawling	1.13 - 2.03	0.94
Deep sea shrimp trawling	0.88 - 1.44	0.83

Cod and shrimp trawling show the largest reduction in 1980.

The calculations included an estimate of total fuel consumption for the Norwegian fishing fleet, 1978-1980. They were based on the estimated energy coefficients and were then multiplied by total catch (distributed over various types of equipment).

The result is an estimate of total consumption which is below previous estimates published elsewhere. It also shows a large reduction in fuel consumption from 1979 to 1980:

Year	Total fuel consumption in the fisheries
1978	408 000 tons
1979	386 000 tons
1980	275 000 tons

Factory trawlers consume most of the fuel, on the average 1 000 tons per year (1980). The average vessel in the coastal fleet consumes the least fuel, some 28 tons per year (1980). (The calculations only concern vessels operated throughout the year and having a length of over 40 feet (13 metres)). If engine size is considered, the deep sea shrimp trawlers consume the most fuel with 0.46 tons per HP in 1980 as opposed to 0.13 tons per HP for the coastal fleet during the same year.

By considering the size of the vessels and the operational period, we find that the fuel consumption per operational day correlates positively with the length of the vessel.

Generally, the fishing fleet can be divided into three groups, each of which use the same fuel consumption per day, depending on vessel size.

The group having the smallest daily consumption included the coastal and bank fishing, the pollack seining, industrial and coastal shrimp trawling. This group comprises ships with a length from 40 to 110 feet and having a daily consumption of 0.1 - 1.1 tons depending on size.

The ring net and deep sea shrimp trawlers comprise the intermediate group. It involves vessels with a length from 90 to 190 feet, with a daily consumption which varies from 1.0 to 4.0 tons depending on size.

The group which consumes the most fuel is the cod trawler fleet (fresh fish, salt fish and factory trawlers). The size of these vessels ranges from 110 to 220 feet but most are between 140 and 160 feet. The fuel consumption varies from 3.0 to 8.0 tons per day. The most common size of these trawlers has a relatively constant daily consumption of slightly less than 4.0 tons.

An economic expression of the energy coefficient, that is, the fuel cost in percent of gross catch income shows a slightly different picture. The percentage varied in 1980 from 7.8% (coastal fishing) to 22.8% (fresh fish trawling). This is a clear increase over the beginning of the period (1971) when the equivalent percentages were 3.3% (coastal fishing) and 17.2% (fresh fish trawling).

The calculations in the report indicate that the increase in cost of energy has led to an energy saving by speed reduction during operations. This means that more time is required. This is particularly evident when 1979 is compared with 1980.

Government quota regulations may have contributed to more efficient use of energy in the fisheries.

Structural changes within the cod fisheries, with a smaller proportion of trawling catches have led to a decrease in energy consumption.

It is possible that all these circumstances have meant that some of the potential savings within the fisheries were already realized in 1980; however, future energy savings are still possible for the Norwegian fisheries.